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WILD ONION: METHODS OF ERADICATION.

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INTRODUCTION.

The wild onion, or garlic (*Allium vineale*), is found in the Atlantic coast region from Massachusetts to Georgia and as far inland as Missouri (fig. 1), and in a large part of that territory it is the worst weed pest. In the spring the cows eat the plant, which results in the dairy products becoming tainted with the offensive odor and flavor. The farmer harvests with his wheat the onion bulblets, which are about the same size and shape as the wheat grains, and the two are difficult to separate. Therefore, when the wheat is offered for sale the millman doeks him a liberal amount. Bread made from garlicky flour, especially if eaten warm, has a pronounced odor and flavor. The money loss from wild onion runs into millions of dollars yearly, while the gastronomic discomfort to the consumers of the tainted flour and dairy products is no minor consideration. During the winter and early spring the green tops of this weed detract much from the appearance of lawns.



Fig. 1.—Sketch map of the United States, showing the distribution of the wild onion.

DESCRIPTION AND HABITS OF GROWTH.

It is highly important to understand how this plant grows, because on a knowledge of its life habits is based the best method for its

NOTE.—This bulletin describes methods for eradicating the weed that is responsible for the "garlicky" taste and odor found in some milk and butter and in some bread and is of especial interest to farmers and dairymen in the Atlantic coast region and as far inland as Missouri. The subject matter is based on and is an enlargement of the Bureau of Plant Industry circular (Doc. No. 410) entitled "The Wild Onion," by J. S. Cates and H. R. Cox.

eradication. In cultivated lands the plants are likely to be scattered, but in pastures, lawns, and other places that have not been disturbed for several years the plants grow in clumps.

The wild onion ripens in June or July, at which time the above-ground portion consists of a stem with several narrow leaves growing along the lower part. This stem is $1\frac{1}{2}$ to $3\frac{1}{2}$ feet tall, and on the top is found a cluster or several clusters of the aerial bulblets shown in figure 2, sometimes incorrectly called seeds. The plant seldom produces true seeds. The underground portion, which is from 1 inch to 8 inches deep, is shown in figure 3. This portion contains from

two to six newly formed bulbs, located at the base of the plant between the leaf layers of the old bulb. The old plant, that is, the stem and the leaves, then dies, leaving these new bulbs to start growth for the coming season. Figure 4 shows the plant illustrated in figure 3 with all the leaves removed, exposing the four bulbs which had been produced. The small detached bulb shown in the illus-



FIG. 2.—Aerial bulblets of the wild onion.

stration was broken off from the dark spot at the base of the large bulb.

It will be noticed in figure 4 that three of these bulbs are small, while the one next to the stem is much larger. The large bulb has a thin, delicate, white skin, while the smaller ones have a hard brown shell around them. The large bulb always germinates in the summer or early fall. The hard-shelled bulbs do not start growth until a considerably later date. A few start in the late fall, but most of them remain dormant until the following spring or an even later period.

It has been found that before all the hard-shelled bulbs have germinated, plants from the soft-shelled bulbs have advanced far enough toward maturity to produce new bulbs. There is consequently an overlapping of generations, which is the secret of the remarkable persistence of this weed.

METHODS OF ERADICATION.

CULTIVATED LAND.

To kill the wild onion, the work must be started in the fall. The object of this work is to destroy the plants from the soft-shelled bulbs before they have advanced far enough to produce new bulbs. The best time is when the food stored in the bulb has been transferred to the growing plant and before the new bulbs have started to form. There is a considerable period when this condition exists, which is when the new plants are about 12 to 15 inches high. This



FIG. 3.—Underground portion of a wild onion at maturity.

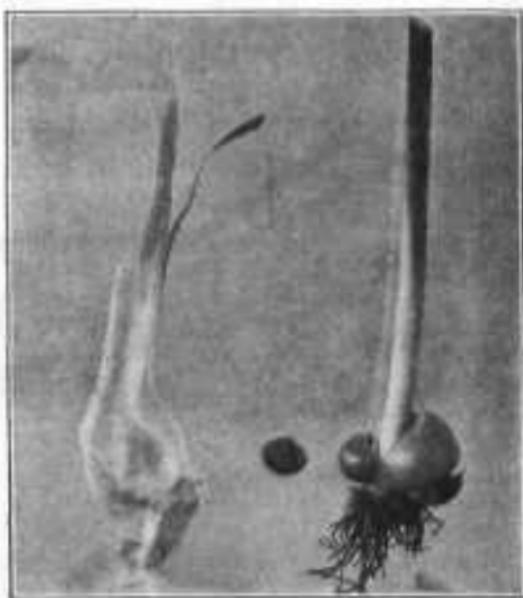


FIG. 4.—Underground portion of the wild-onion plant shown in figure 3 with the leaf layers removed, showing the four new bulbs which this plant has produced.

is during October and November in the South and November and December in the North. When this stage has been reached, the land should be plowed fairly deep, turning under all the onion tops. This will dispose of these plants. If this plowing were put off until spring, however, these plants would have formed new bulbs, which would be able to grow even though the parent plants were destroyed. It is highly important that the tops be completely buried by the plowing; otherwise many of them would keep on growing. A plow with a jointer attached to the beam (fig. 5) will often be a great help in thoroughly turning under the tops, while disking the land previous to plowing will also aid in accomplishing this result.

The following spring the field should be planted to a cultivated crop. Corn, preferably planted in checkrows, is best. It may be necessary to plow again shallowly in the spring, but ordinarily a disk or two previous to planting will suffice. In cultivating the corn, the effort should be to kill the onion plants that spring up, and the easiest way of doing this is to cut off the tops. The best implements, therefore, are those that cut off all the tops instead of letting them slip through and keep on growing. Cultivators of the sweep type are best for this purpose. Figure 6 shows a number of implements of this kind. On many of the modern cultivators sweeps 9 to 18 inches wide may be quickly attached in place of the shovels. Some soils, of course, are too stony or otherwise unsuitable for the use of sweeps.

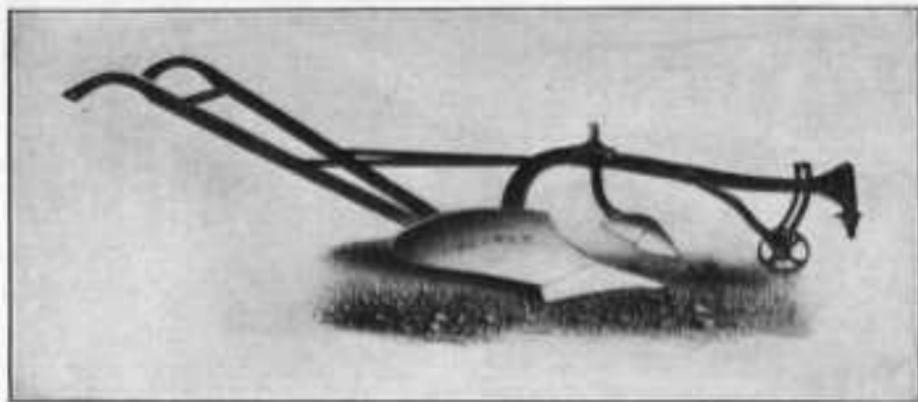


FIG. 5.—Plow with jointer.

From the time the farmer is able to get on the land in the spring until the corn is laid by, his efforts should be directed toward preventing the onion from making top growth. This spring and early-summer work is to kill the plants that come up from the hard-shelled bulbs. If it is well done, most of the onions will have disappeared by the end of summer. Some of the hard-shelled bulbs, however, may delay germination for a year or two, so that by fall a few plants may again be in evidence. Hence, the farmer should be prepared to follow the same plan of a deep plowing late in the fall, to be succeeded by a cultivated crop the next spring, giving careful cultivation to this crop. In two years this treatment is almost sure death to all the wild onions in the land, and the work can be carried out with but little extra labor and expense.

The aerial bulblets germinate in the early fall, like the soft-shelled bulbs, but the plants are weak and are readily destroyed by the fall plowing.

Many farmers have tried the method outlined here and have found it to be entirely satisfactory.

As a variation of the ordinary plowing some farmers have used trench plowing with success. This consists of running a plow about 4 or 5 inches deep and following this with another plow in the same furrow at a depth of 10 inches or more. The wild-onion plants and ungerminated bulbs being in the upper 4 or 5 inches are thus turned into a deep furrow and covered up by the second plow, burying them so that their tops can never reach the surface. In a soil of average depth, however, it is not desirable to turn up so much subsoil to the surface.

PASTURES AND LAWNS.

If grass lands are quite full of the onion plants, the easiest way of disposing of them is to follow the cultivation method already outlined. There are many fields, though, where these weeds are not very numerous and where it would not pay to follow such a radical course.

The Department of Agriculture has experimented with various methods of killing each plant or group of plants in such situations. Treatments were tried out with a number of the most promising plant poisons, such as fuel oil, coal-tar creosote oil, arsenite of soda solution, and common salt. A small quantity of each of these poisons was applied to each plant or group of plants. While all these substances killed the plants, only one of them, namely, coul-

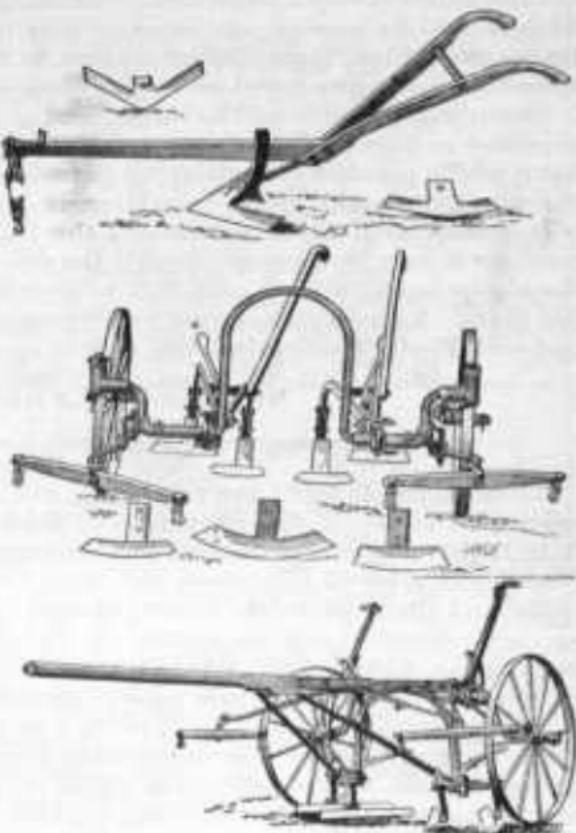


FIG. 6.—Various types of cultivators equipped with knives or sweeps that are effective in cutting off the tops of the wild onion.

tar creosote oil, affected the ungerminated bulbs as well. It was found that 10 cubic centimeters (about 4 thimblefuls) of this material was quite effective. The most feasible method for the average farmer, however, is to dig up the plants or clumps with a mattock. One well-directed stroke when the soil is moist and soft will take out the entire clump by the roots, including the ungerminated bulbs. This should be carried off, so as to give no further trouble. It is then a good plan, especially on a lawn, to fill the hole with soil and sprinkle a little grass seed on the surface.

Sheep eat the tops of the onion, and grazing for a few years is reported as an efficient remedy for the pest. The sheep apparently eat it to the greatest extent during the winter and early spring, when there is little other green vegetation in sight, or in poor pastures, where there is little to choose but the wild onion. On the better pastures it may be necessary to salt the onions occasionally to induce the sheep to get a taste sufficient to overcome their natural dislike for them. These animals may be of considerable help in reducing, and even finally eradicating, this pest in pastures.

MEASURES THAT HELP.

PREVENTING THE FORMATION OF BULBLES.

As the aerial bulbles are practically the only means by which the onion pest is distributed from field to field and from farm to farm, it is highly important that the formation of the bulbles be prevented. If allowed to mature, they may be harvested with hay and grain and then carried to other parts of the farm. They are also carried by water and deposited on uninfested fields, where they propagate. Cutting the tops of the onion plants before they are ripe will prevent them from producing bulbles.

Late plowing for small grains.—It has been found that if plowing is delayed until a late date in the fall and the land is planted to small grain, only a few onion plants will ripen their aerial bulbles by harvest time the following summer. This late plowing disposes of those onion plants that start growth before plowing and gives the grain more than an even start with the garlic that begins growth after planting. As the plowing should be done at such a late date as to prevent the best development of fall-sown grains, it is preferable to plant spring grains. If circumstances require the sowing of fall grain, it should be done with the full knowledge that the necessarily late planting will probably reduce the yield. Seeding a fall-grain crop after late plowing has the least harmful effect on yield in the southern part of the onion belt, where wheat may be planted as late as November or December.

PREVENTING THE DISTRIBUTION OF BULBLETS.

If the bulblets have been permitted to mature it is important to prevent their further distribution. The most common method of distributing the wild onion is in small grain used for seed. Only grain free from the bulblets should be planted. Figure 7 shows wheat grains and onion bulblets as they appear at harvest time.

There are several practical methods for insuring onion-free seed wheat. Artificial drying makes the bulblets lighter and thus more easily fanned out; letting the grain stand a year accomplishes about the same result as artificial drying; if the bulblets are allowed to freeze, they afterwards become dry and can be readily fanned out; or, clean grain for seed may be purchased from some outside source. Another plan is to set aside a small area of land, free from onion, for producing seed grain. Since the quantity used to seed this patch is small, all the garlic bulblets can easily be removed by hand, if necessary.

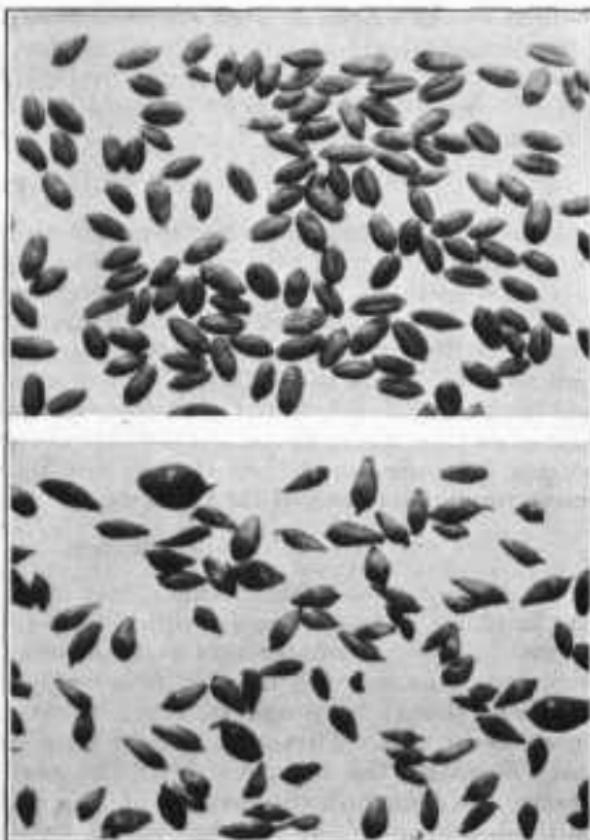


FIG. 7.—Wheat grains and newly matured wild-onion bulblets. Their similarity in size and shape makes separation difficult.

WILD ONION AND MARKET WHEAT.

On boards of trade, wheat containing garlic bulblets in considerable quantity is graded "rejected" and is then sold only on sample. Such grain is generally sold at a price ranging from 20 to 50 per cent lower than No. 2 Red. Millers often refuse to handle onion-

infested wheat, for they are able to grind it only at a much-increased cost. The bulblets gum the rollers, making it necessary to stop the mills frequently and wash the rollers before the grinding can be continued.

While the garlic bulblets become lighter and hence are more easily fanned out of wheat in from six months to a year after harvest, it is often impracticable to delay grinding for such a long period. In that case the infested grain may be artificially dried in a commercial grain drier, after which the bulblets may be easily removed by good cleaning machinery.

WILD ONION AND DAIRY PRODUCTS.

It is often feasible for the dairyman to eradicate this weed from his pasture; but until this eradication is accomplished he should follow such methods as will prevent losses from tainted milk. It has been found by the department that increasing the length of time between feeding on the onion and milking reduces the unpleasant odor and flavor. There is only a slight odor and flavor to milk when cows are kept off onion-infested pastures for four hours before milking, and even this slight flavor almost entirely disappears when the milk stands for four hours. At the present time this appears to be the most practicable method for reducing the onion flavor in milk.

SUMMARY.

To destroy wild-onion plants, plow deeply in the late fall, when the tops are a foot or more high. The tops should be thoroughly turned under. A jointer attached to the plow, as also disking previous to plowing, will help in this respect. The following spring the land should be prepared for a cultivated crop, corn in check-rows being best. This crop should be given careful cultivation to keep down all the top growth of the garlic. If any onion plants persist the next fall, the method of late fall plowing, followed by a cultivated crop in the spring, should be repeated. This treatment will eradicate practically all the onion.

It is sometimes impracticable, for the time being, to eradicate this pest completely. In that case an important remedial method is to plant small grain late, plowing and preparing the land just before planting. While this will not destroy the onion, it gives it such a setback that the bulblets do not have time to mature before harvest, so that the grain is comparatively free from them. This method prevents the spread of the weed by means of the aerial bulblets.

Another remedial measure is to use for seed only such grain as is free from onion bulblets, since infested grain is one of the principal means by which this weed spreads.